

RESPONSE TO PUBLIC COMMENTS

From August 22, 2007 to September 20, 2007, the United States Environmental Protection Agency (EPA) and the Massachusetts Department of Environmental Protection (MassDEP) solicited public comments on a draft NPDES permit, developed pursuant to an application from the Swansea Water District (SWD) for a permit to discharge wastewater to the Palmer River from the Swansea Water Treatment Facility. After a review of the comments received, EPA has made a final decision to issue the permit authorizing the discharge. The following response to public comment briefly describes and responds to the comments on the draft permit and also describes the changes made to the permit. A copy of the final permit may be obtained by writing or calling Betsy Davis, United States Environmental Protection Agency, 1 Congress Street, Suite 1100 (CMP), Boston, Massachusetts 02114-2023; Telephone (617) 918-1576. The final permit may also be found on the EPA Region 1 web site at:
http://www.epa.gov/region1/npdes/permits_listing_ma.html.

Attachment A is a letter from Stephen Barrett, Bluewave Strategies, to Deerin Babb-Brott, Assistant Secretary, Massachusetts Environmental Policy Act Office (MEPA), that clarifies changes to the intake and discharge flows for the proposed Swansea Desalination Project.

Attachment B is a letter from Melville Cote, Chief, Oceans and Coastal Protection Unit, EPA Region 1 to Louis Chiarella, New England Field Office Supervisor for Habitat Conservation, National Marine Fisheries Service (NMFS) that provides NMFS with additional information on potential impacts to designated essential fish habitat (EFH) related to this project.

Attachment C is a letter from Deerin Babb-Brott, Assistant Secretary, MEPA Office to Stephen Barrett, Bluewave Strategies on MEPA's determination, regarding the changes to the intake flow increase for the Swansea Desalination Project.

Comments submitted by Mary Colligan, Assistant Regional Administrator for Protected Resources Division of the National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS) Northeast Region on September 5, 2007.

Comment #1: While several species of listed whales and sea turtles occur seasonally in waters off the Massachusetts coast and population of the federally endangered shortnose sturgeon occur in the Connecticut and Merrimack Rivers, no listed species are known to occur in the Palmer River. As such, no further coordination with NMFS PRD is necessary.

Response: Comment noted.

Comments submitted by Steven J. D'Amico, Representative 4th Bristol District, House of Representative in the Commonwealth of Massachusetts on September 5, 2007.

Comment #2: I'm writing in support of the discharge permit for Swansea Water District's desalination project. The desalination project meets an established need to provide clean potable water for the town.

Upon review of the draft permit, it appears clear that no significant impacts on the ecosystem of the Palmer River are anticipated. The requirements for ongoing

monitoring and testing, including WET testing, should ensure that the river will remain healthy over the entire course of the plant's operation.

Response: Comment noted.

Comments submitted by Patricia A. Haddad, State Representative 5th Bristol District, House of Representative in the Commonwealth of Massachusetts on September 6, 2007.

Comment #3: I'm writing in support of the discharge permit for Swansea Water District's desalination project. The desalination project meets an established need to provide clean potable water for the town.

Upon review of the draft permit, it appears clear that no significant impacts on the ecosystem of the Palmer River are anticipated. The requirements for ongoing monitoring and testing, including WET testing, should ensure that the river will remain healthy over the entire course of the plant's operation.

Response: Comment noted.

Comments submitted by Paul Diodati, Director, Massachusetts Division of Marine Fisheries, on September 17, 2007.

Comment #4: *Marine Fisheries* has the following comments and recommendations for the permit. We note Figure 2 of the Fact Sheet appears to indicate 3.89 million gallons per day (mgd) of Palmer River water will be withdrawn for the facility. Discussion in the Fact Sheet Section V, Essential Fish Habitat states the proposed project will withdraw approximately 4.92 mgd of raw river water from the Palmer River. Both withdrawal rates in the fact sheet are considerably higher compared to an EOEA Secretary Certificate dated August 9, 2006 issued for review of a Notice of Project Change on this project dated June 30, 2006. We recommend EPA review this to determine if a discrepancy exists between the Secretary's Certificate and the Permit, as it could result in a different permitted effluent discharge flow limitation.

Response: The amount of water proposed to be treated at the facility is the sum of groundwater and surface water, totaling 4.92 mgd. Section V. of the fact sheet, Essential Fish Habitat, erroneously refers to 4.92 mgd of water withdrawal from the Palmer River. Withdrawal from the Palmer River will be 3.89 mgd and withdrawal from the Vinnicum wellfields will be 1.03 mgd as shown in Figure 2 of the fact sheet.

The permit application filed by the permittee pursuant to 40 CFR 122.21 estimated the average discharge flow to be 2.71 MGD. As shown on Figure 2 of the fact sheet, the average discharge flow is the difference between the total flow treated by the facility and the drinking water produced and the water in the sludge removed from the sludge drying beds.

$$4.92 \text{ mgd} - (2.18 \text{ mgd} + 0.03 \text{ mgd}) = 2.71 \text{ mgd}$$

Increases to the intake and discharge flows (which are the flows used in developing the permit) were provided in the Supplemental Environmental Impact

Report filed on February 16, 2006. The increases for both are based on the need to keep the salinity level in the effluent at or below 32 parts per thousand and keep the approach velocity at the intake structure at 0.01 feet per second. On March 31, 2006, Stephen Pritchard, the Secretary of Environmental Affairs, issued a certificate determining the SFEIR was adequate. See Attachment A of this document for a detailed explanation and clarification of the intake and discharge flows.

Comment #5: Fact Sheet Section V. refers to DEP issuing a Water Management Act Permit for the project. Through consultation with DEP we understand a Water Management Act Permit will not be issued.

Response: A letter dated April 22, 2005, from MassDEP to the SWD, addresses the circumstances under which the District would need a Water Management Act (WMA) Permit for the intake flow. The letter states that a permit will not be required provided the SWD does not pump a volume of fresh water in excess of the WMA threshold. The threshold is defined as an average of 100,000 gallons per day for a cumulative total of nine (9) million gallons over a consecutive three month period.

To ensure SWD will not exceed this threshold, the District will install continuous monitoring instrumentation on the raw water pipeline that will record flow and specific conductivity. The volume of fresh water withdrawn from the river (water with specific conductivity less than 1,000 umhos/cm) will be entered into the facility's SCADA system at the water treatment plant and a report of the running total of fresh water volume will be submitted to MassDEP. A copy of the letter is in the NPDES administrative file.

Comments submitted by Louis Chiarella, New England Field Office Supervisor for Habitat Conservation, National Marine Fisheries Service, National Oceanic and Atmospheric Administration, Northeast Region, on September 20, 2007.

Comment #6: The National Marine Fisheries Service (NMFS) has reviewed the US Environmental Protection Agency's (EPA) public notice, fact sheet, and draft National Pollutant Discharge Elimination System (NPDES) permit for the Swansea Desalination Project located in Swansea, MA. The purpose of the project is to provide an additional source of potable water for the Town of Swansea, Massachusetts. Components of the project include the development of a water intake structure within the Palmer River, a pumping station, a filtration plant and reverse osmosis facility, water transmission lines, and a diffuser for the disposal of the brine concentrate into the Palmer River. As described in the EPA's fact sheet, the applicant proposes to convert approximately 3.89 million gallons per day (mgd) of tidally influenced river water (and 1.03 mgd from local wellfield) to 2.18 mgd of potable drinking water. Furthermore, the project proposes to discharge approximately 2.71 mgd of concentrated brine back into the Palmer River.

NMFS has been involved with this project since its inception and has provided comments throughout the Massachusetts Environmental Policy Act (MEPA) process. Throughout much of the review process and prior to the release of the Supplemental Final Environmental Impact Report, the anticipated water usage

and discharge was estimated to be an intake of 2.0 mgd from the Palmer River, and a brine discharge of 0.7 mgd back into the Palmer River. These lower volumes served as the basis for our comments and recommendations throughout the MEPA process.

The Magnuson-Stevens Fishery Conservation and Management Act (MSA) requires federal agencies such as the EPA to consult with the Secretary of Commerce regarding any action or proposed action authorized, funded, or undertaken by the agency that may adversely affect Essential Fish Habitat (EFH) identified under the MSA. NMFS believes that this project may result in adverse impacts on EFH, but, unfortunately, our ability to assess potential impacts on EFH and associated marine resources is being complicated by deficiencies in the EFH assessment. The EFH assessment contained in the EPA's fact sheet lacks a description of the fishery resources present within the river, as well as a detailed analysis of adverse effects to EFH resulting from this project. The NPDES permit application, dated October 2006, submitted by the applicant contains an Expanded EFH assessment which describes, in sufficient detail, the resources present in the river and potential impacts on EFH; however, the analysis appears to be based on the lower volumes of water, as noted above. While it is not clear to what extent the EPA intends to incorporate portions of the applicants EFH assessment into their own analysis, a complete and adequate assessment should be based on the increased volumes of water currently being considered. The level of analysis should be consistent with the expanded EFH assessment presented in the applicants NPDES permit application.

Accordingly, NMFS seeks to extend the comment period so that the US EPA may provide NMFS with better information, as noted above, regarding the impacts of the project on NMFS trust resources which are necessary for the development of EFH conservation recommendations.

Response: As the commenter states, EPA is required to consult with the Secretary of Commerce regarding any action or proposed action authorized, funded or undertaken by the agency that may affect Essential Fish Habitat (EFH) identified under MSA. Such consultation does not have to be completed by the close of the public comment period but should be completed prior to the final permit action.

The fact sheet accompanying the draft permit did not provide EPA's complete EFH assessment. We completed our assessment after the close of the public comment period and transmitted it to NMFS on November 7, 2007. This assessment was based on the flows established in the February 2006, Supplemental Environmental Impact Report (SEIR), a thorough description of the fishery resource in the Palmer River, and a detailed analysis of potential impacts to EFH for this project, and concludes that the effects on EFH have been minimized. See Attachment B for additional information on EPA's EFH analysis. On November 27, 2007, EPA received a letter from NMFS concurring with EPA's assessment.

Comments submitted by Cindy Delpapa, Massachusetts Riverways Program, Division of the Department of Fish and Game, on September 20, 2007.

Comment #7: We fully support requiring the Permittee to monitor various nitrogen compounds- this is an important consideration for the nitrogen sensitive and stressed Narragansett Bay.

Response: Comment noted.

Comment #8: Maintaining a dissolved oxygen concentration of 6.0 mg/l is equally important in a Class SA waterway that supports a thriving aquatic ecosystem.

Response: Comment noted.

Comment #9: The permit requires the preparation and execution of a monitoring program by the Permittee. We heartily support this permit requirement. With a new discharge whose impacts are based on models and other predictive tools, the monitoring will provide corroboration on the accuracy of the predictions and potentially prevent negative impacts to the waterway if unanticipated results are identified quickly through this monitoring.

Response: Comment noted.

Comment #10: The Fact Sheet explained the need for chlorine based cleaners for maintaining the membranes used in the treatment process. It is unclear why these chlorine based chemicals can not be captured and treated off-site as is the disposal method to be used for other cleaning, anti-scaling and corrosion control substances. If at all technically feasible, it would be preferable to prevent the release of chlorine compounds into the effluent by collecting the cleaning by-products for off-site disposal.

Response: The final permit has stringent effluent limits for monthly average and maximum daily Total Residual Chlorine (TRC) based on the chronic (7.5 mg/l) and acute (13 ug/l) water quality criteria as defined in the National Recommended Water Quality Criteria, 2000 and adopted by the MassDEP into the State Water Quality Standards. The cleaning solutions will be treated, neutralized, and dechlorinated prior to being blended with the brine and discharged to the river.

Comment #11: If chlorine is to be a component of the effluent we would like to propose for consideration that monitoring be increased during or coordinated with those periods when the membranes and screens are being cleaned. It seems likely there is a greater likelihood of chlorine being present in the effluent.

Response: Footnote 6 in the draft permit coordinates sampling requirements for TRC with the use of chlorine. The footnote has been carried over to the final permit and specifies when chlorine is added to the wastewater, the effluent shall be sampled for total residual chlorine. Chlorine or a chlorine solution will typically be used for cleaning the microfiltration and reverse osmosis membranes. The wastewater will be dechlorinated prior to mixing with the blended brine. See footnote number 7 of the final permit.

Comment #12: The Fact Sheet provided an interesting narrative on the copper issues associated with this new facility. We are pleased to hear the Palmer River copper concentration is not abnormally elevated. Still the river does have enough of a

background concentration of copper to raise some concerns about a more concentrated stream of copper being discharged into a waterway with little dilution. Since copper in even minute concentrations can be deleterious to marine systems especially, the estimate of the ability of the Palmer River to dilute the effluent may prove to be inaccurate. With a background concentration already approaching the marine copper criteria; we would like to strongly advocate for the inclusion of in-stream copper monitoring to the required monitoring program in the permit to see if the predicted concentrations are realized. If the copper concentration in the Palmer River is found near or at marine copper criteria, we feel a copper concentration limit on the effluent would be needed to protect the receiving waters.

Response: There is a monthly reporting requirement for copper in the final permit and data on instream levels will be collected upstream of the discharge as a requirement of the toxicity tests. The previous data, in conjunction with the data provided from the monthly DMRs, and toxicity tests will provide the Agencies with sufficient data to determine if there is a reasonable potential for a water quality excursion. If the data indicates there is a reasonable potential for an excursion of water quality criteria, the permit can be modified. See Section D. Permit Reopener.

Comment #13: The maximum effluent salinity coupled with a discharge at the higher tide levels should reduce impacts. Has there been any discussion concerning instituting a maximum *change in salinity* (Δ ‰) between the effluent and the river at the time of discharge? It would be comparable to the draft permit's sound and protective requirement for pH levels. If the effluent salinity did not significantly deviate from the receiving water, the likelihood of unintended consequences would be reduced. Maintaining a relatively homogenous salinity may prove to be an important goal to maintain fish populations and their migration and out migration.

Response: Due to the significant tidal influence in this reach of the Palmer River, ambient salinity concentrations change frequently throughout each tidal cycle. Organisms that reside in, or migrate through, this area are capable of adapting to varying salinities as long as the concentration remains within the ambient range. This permit requires that the maximum salinity of the discharge never exceed 32 parts per thousand, which is the maximum ambient concentration recorded near the proposed outfall. Dilution within the river is expected to further reduce the salinity down to background concentrations within 15 feet of the outfall. Therefore, EPA does not anticipate any impedance to fish migration related to the salinity plume. The permittee will be required to conduct salinity monitoring to characterize the plume, and confirm the accuracy of the modeling results.

Comment #14: We would also like to advocate the required receiving water monitoring include an assessment to determine if the effluent/brine discharge proves to be an impediment to aquatic species passage. Given the shallow 4 m depth at the discharge and the predicted 9.7 m mixing zone, there appears to be a possibility for some interference with passage should there be a 'salinity barrier' created by the plume.

Response: Massachusetts Water Quality Regulation 314 CMR 4.03(2) (b) requires that mixing zones shall not interfere with the free movement of fish or other aquatic

life and the permit must meet this regulation. We believe the required ambient monitoring plan in the final permit will verify that water quality standards are achieved at the edge of the mixing zone, and that the discharge does not impede passage for aquatic species.

As stated in response to the previous comment, aquatic species that migrate through the mixing zone area adjust to changes in salinities as long as the concentration remains within the ambient range, in this case, salinities must stay at or below 32 ppt.

Comment #15: As with all discharges into waters with little dilution, the value of whole effluent toxicity testing is incalculable. What is a puzzle for this permit is the lack of a limitation for the chronic toxicity test (C-NOEC). If the dilution factor used for this permit is 1.3, shouldn't a C-NOEC limitation of 77%, (the inverse of the dilution factor) be included as is common practice with other MA NPDES permitted discharges? We would be pleased to see both acute and chronic limitation for this new discharge to be sure this Class SA waterway is fully protected.

Response: A chronic no observed effect concentration (C-NOEC) limit of 77% has been added to the final permit.

Comment #16: It is now common to provide an opportunity for a Permittee to request a reduction in WET testing frequency after a set number of acceptable results. This opportunity is included in this permit but would it be possible to extend the time frame so the consideration of a reduction coincided with the first renewal of this permit in five years? For a brand new discharge of a relatively new sort of effluent for a facility that may take some time to work up to capacity, we see an advantage to waiting until the permit renewal phase which would allow interested parties to consider the change, should it be requested, and weigh in on the merits of a reduction.

Response: Language in the final permit requires that eight sets of toxicity tests be submitted, all which demonstrate compliance with the WET test requirements, before the permittee may request the frequency of the tests be reduced.

Conditions in the final permit concerning a reduction in the number of species used in the tests will remain the same as in the draft permit. The permittee may request a reduction in the number of species used in the Whole Effluent Toxicity (WET) tests after a year's worth of data. The Agencies believe it is reasonable to eliminate testing a specie if it is apparent that it is consistently less sensitive than the other.

As stated in the final permit a reduction in the number of species or in the frequency of tests is not automatic. The Agencies will conduct a review of all toxicity tests before making a change to the WET tests and any reduction in the WET test requirements will be valid only after the permittee has been notified from the Agency that a change in the permit conditions has been approved.

Comment #17: One final issue related to this permit and the MEPA documents (FEIR and NPC) reviewed as part of the supporting material for this permit application is the

discrepancy in several of the withdrawal and discharge volumes. The MEPA documents suggest a much higher recovery rate from the reverse osmosis process than the 31% recovery listed in the Fact Sheet in figure 2. With a recovery rate less than half that cited in the MEPA documents the amount of wastewater generated per unit volume of river water withdrawn is markedly different. Which is the more accurate rate? If the recovery rate found in the MEPA documents is correct than the effluent volume limitation in the permit is far higher than it needs to be and should be lowered. We also hope the apparent inconsistencies in numbers can be rectified.

Response: The recovery rate of the treatment facility will vary between 30% and 60% depending on the salinity of the raw water. Figure 2 in the fact sheet shows the membrane recovery rate of 31% based on peak summer design conditions, when the volume of freshwater is at a minimum. As the salinity in the river decreases the membrane recovery rate will increase.

For the Swansea Water District to meet and maintain the necessary production of potable water for the Town and meet an effluent limit of 32 ppt salinity, the intake flow must be increased when the salinity level in the river increases.

See Response to Comment #4 for clarification on flows.

Comment #18: The withdrawal volume listed in the most recent MEPA filing, the NPC in June of 2006, says wastewater generation will be 0.7 MGD generated from a river withdrawal of 2 MGD. In the NPC, the effluent volume used to generate the curves predicting the salinity concentrations in the river at various tidal regimes is not stated. If the effluent volume of 0.7 MGD was used in the model than the salinity prediction curves may be unduly optimistic about the changes in salinity in the Palmer River.

Response: See Attachment A for clarification of the volume of water that will be withdrawn from the river and the effluent discharged to the river. The salinity prediction curves in the June 2006 Notice of Project Change (NPC) correspond to data in Table 2-1 and 2-2 in the NPC. The tables provide input data used in the Plumes model to generate the salinity prediction curves. The model was run with several intake and discharge flows as shown in the tables, but the limiting factor used in the model was salinity not flow.

Comments submitted from Dave Edson, Prism Environmental on behalf of the Swansea Water District, on September 20, 2007.

Comment #19: On page 1, the address of the facility where the discharge will be generated (i.e., the water treatment plant) should be 298 Vinnicum Road, not 294 Vinnicum Road. The actual discharge will occur at the Palmer River, about 2 miles away, near the Old Providence Road bridge.

Response: The address of the facility has been changed in the final permit.

Comment #20: Firstly, no chemicals will be used to flush or clean pipelines so we can agree with that prohibition.

The MF (microfiltration) membrane system will be subject to a cleaning operation approximately every 30 days called CIP (Clean In Place). The RO (reverse osmosis) membrane system will also require CIPs, but only 2 to 4 times a year.

The CIP procedure will include an acid wash, using a 2% solution of citric acid and a combined caustic/chlorine wash using a 1% solution of sodium hydroxide. These washes will be followed by rinses using similar chemical solutions. The spent solution streams will empty to a tank for neutralization to pH 7 and dechlorination and then be pumped to the concentrate storage tank to mix with the RO reject water prior to discharge to the receiving water (Palmer River).

During peak operation, the daily volume of RO reject will be approximately 2.7 million gallons. The volumes of spent neutralized acid and caustic (as chemical) will be negligible in comparison. The concentration of *neutralized* former acid will be about 0.01% and the concentration of *neutralized* former caustic will be about 0.003% in the discharge presenting no significant environmental threat.

Although the CIP chemical volumes are insignificant when diluted with the RO reject stream, the spent solution amounts would be expensive to capture in a separate tank and trucked off-site for disposal. The total volume of spent CIP solutions would be about 18,000 gallons for the MF pretreatment system and 11,000 gallons for the RO system requiring a large tank not currently in the plant design and multiple truckloads to a receiving facility.

For the reasons outlined above, we request that the draft permit be changed to allow the CIP solutions described above to be discharged to the receiving water following neutralization, dechlorination and dilution with the RO reject stream.

Other than the CIP procedure mentioned above, regular backwashing of the MF membranes will use either filtered drinking water with no added chemicals or a mild chlorine solution which will be dechlorinated in accordance with the draft permit conditions.

Response: The Agencies' concern is that wastewater from the pretreatment membrane cleaning process has the potential to increase solids to the receiving water and that an increase in BOD₅ is likely to occur if citric acid is used to clean the membranes. An article in the Journal of American Water Works Association, titled, "Residuals Management for Low-pressure Membranes, page 75, June 2003, states, "If citric acid is used in the CIP (Cleaning in Place), the biological oxygen demand (BOD₅) of the spent cleaning solution likely to be very high."

The final permit requires the spent CIP (Cleaning in Place) solutions from the microfiltration membranes and the pretreatment strainer wastewater be sent to the sludge drying beds for treatment prior to mixing with the blended brine effluent. This is a change from the requirement in the draft permit that required the permittee to ship the CIP wastewater off-site.

The Agencies based this decision on information provided in the above comment and a memo from Dave Edson, Hoyle, Tanner and Associates sent to the Steve Barrett, Bluewave Strategies that discusses wastewater generated from the

pretreatment process. The memo is part of the administrative record and available for review at EPA Region 1, 1 Congress Street, Boston, MA 02114.

The memo characterizes wastewater from the microfiltration membrane CIP process and the pretreatment system strainers. It clarifies that the objective of the chemically enhanced CIP process is to dissolve solids from the membranes so that the solids will be lower than the regular backwash process that is sent to the sludge drying beds for treatment. The volume of solids from the pretreatment strainer is expected to be small and is characterized as very fine particles in the memo. The memo also reiterates wastewater generated from the pretreatment strainer and the pretreatment CIP cleaning are expected to be significantly less than the wastewater from the water treatment process and explains that both wastewater streams can be sent to the sludge drying beds for on-site treatment.

The Agencies agree that sending the pretreatment CIP and strainer waste streams to the sludge drying beds prior to mixing with the blended brine is an adequate treatment method, and the final permit requires these waste streams be sent to the sludge drying beds for treatment prior to mixing with the blended brine.

The final permit also includes BOD₅ and TSS monitoring requirements for the influent and effluent of the sludge drying beds. This sampling will show the characteristics of the wastes discharged to the system from the CIP, pretreatment strainer, and back wash and show the systems efficiency in removing these wastes.

Changes to the Final Permit

The final permit requires, chronic, modified acute, and acute toxicity tests be performed on the effluent. The *Mysidopsis bahia* (mysid shrimp) shall be used in lieu of the *Arbacia punctulata* (sea urchin) for the acute toxicity test requirement. Copies of both the Marine Chronic and Marine Acute Toxicity Test Procedures and Protocols have been included as Attachments A and B of the final permit.

BOD₅ and TSS monitoring of CIP and back wash flow entering and exiting the sludge drying beds have been added to the final permit.

Monitoring Program Clarification

Part 1.B of the final permit requires the permittee to develop and submit an ambient monitoring plan to EPA and MADEP within 30 days of initiating the discharge. This ambient monitoring plan shall provide information on the dilution provided by the diffuser, and the size of the mixing zone, and confirm that water quality standards have been met at the edge of the mixing zone.

Part 1.G of the final permit also incorporates monitoring requirements that are part of the State's water quality certification dated February 19, 2008. These monitoring requirements were presented in Section 7.0 of the Town's October 2006 NPDES permit application and updated in the Supplemental Information Document submitted in April 2007. Section 7.0 of the Town's NPDES permit application outlines a comprehensive monitoring plan that includes verifying the accuracy of the modeling data. The modeling data was used to determine the characteristics of the mixing zone.

As a point of clarification, the permittee may submit one data set if overlap between the two monitoring plans exists.